



# Today, Tomorrow, the Future

By Dan Steber and Jack Stewart

## Introduction

The editors of *Mech* and *Approach* met with PMA202 (Aircrew Systems) and PMA209 (Air Combat Electronics) representatives to learn more about several NAVAIR programs that make naval aviation better and safer. We discussed several aircrew-system programs currently in development with PMA202, and we received an update on the military flight operations quality assurance (MFOQA) program from PMA209. We want to provide our readers with an overview of these programs, and offer information to all aviators as to the NAVAIR process.

Fleet inputs are an important part of the process. Aviator and maintainer feedback on systems performance, innovations, and ideas for product enhancement passed to NAVAIR, and through WESS reporting, gives them the tools to initiate, develop, modify and produce the software and hardware necessary for the users to carry out the mission, today, tomorrow and in the future.

### NAVAIR Vision

We exist to provide cost-wise readiness and dominant maritime combat power to make a great Navy/Marine Corps team better.

### NAVAIR Goals

To balance current and future readiness. We need to ensure that we provide our naval aviators with the right products to fight the Global War On Terrorism and other potential future conflicts.

To reduce our costs of doing business. We need to pursue actual cost reductions, not so-called "savings" or "avoidance." We need to return resources to recapitalize our fleet for tomorrow. We must continue to introduce best business practices and remove barriers to getting our job done with greater efficiencies.

To improve agility. Our ability to make rapid decisions in support of emerging fleet requirements is essential if we are to continue to provide value to the nation. We must reinvigorate a solid chain of command that values responsibility and accountability in its leadership.

To ensure alignment. We have come a long way aligning ourselves internally; now it is time to ensure that we are fully aligned, internally and externally, with CNO's transformation initiatives.

To implement fleet-driven metrics. Single fleet-driven metrics will ensure we directly contribute to the Naval Aviation Enterprise.

# PMA202: Aircrew Systems

*Mission: Provide the Navy and Marine Corps with cost-wise aircrew systems by developing, integrating, fielding, and supporting aircrew safety, survivability and mission enhancement core capabilities.*

**T**he business card for Capt. CJ Jaynes, PMA202 program manager, says, “Service to the Fleet,” and a visit with her team revealed it’s more than just a motto.

This NavAir program office provides the Navy and Marine Corps with cost-wise and safe aircrew systems. They make sure personal equipment does what it’s supposed to do when aviators or maintainers need it—lives depend on it.

Capt. Jaynes sums up her department’s work with a simple statement: “If you’re going to change anything on the human, see 202 first.”

A big challenge for her team is their work on a wide variety of programs, including aircraft systems and aircrew, survival electronics, chemical-biological defense, and fleet-support systems.

Continually improving aviation gear, PMA202 focuses on getting users what they need. They not only rely on feedback reports but also visit with and talk to the fleet to ensure the right products are developed. This firsthand look, or “boots on the ground” effort, allows for valuable dialog and a better understanding of the fleet’s needs.

Cdr. Tom Wheaton, who works the class desk, explained, “Warfighters look for tools to get the job done, and they want them now. But now is difficult to do. Developing, acquiring, fielding, and supporting take time. Quality takes time, and the gear needs to work the first time, every time.”

Here’s an overview of several programs and projects that PMA202 currently is working on:

## **Aircraft-mounted systems:**

Tracking aircraft- mishap trends, using reported incidents and information from the Naval Safety Center, is the foundation for many of our projects, according to Gary King of the aircraft mounted-systems team. This mishap data inspired development of the mobile aircrew restraint system (MARS), which protects crew members in the cabin during a hard landing or mishap. The



## Naval Air Systems Command

NAVAIR is a Navy command, headquartered in Patuxent River, Md., with military members and civilian employees stationed at eight principal continental United States sites and two principal sites overseas. NAVAIR provides unique engineering, development, testing, evaluation, and management capabilities to deliver airborne weapons systems that are technologically superior and readily available. Using a full-spectrum approach, the command delivers solutions at optimal costs and provides support for vital programs for the U.S. Navy. NAVAIR works effectively as part of a warfighting partnership, known as the Naval Aviation Enterprise (NAE) and the larger Navy Enterprise, through which interdependent issues affecting multiple commands are resolved on an Enterprise-wide basis. The NAVAIR commander serves as the NAE operations officer.

system uses a modified inertial reel originally developed for crashworthy seats and integrated to the airframe and aircrew vest.

Another mishap trend indicated the need for a new crash-protection system, the common crash-resistant troop-seat system (CCRTSS), which PMA202 quali-

fied in 2004. It is the best crash-attenuating passenger seat in the Navy today and is being fielded in all new production UH-1Y aircraft.

The premier ejection seat in use today is the Navy aircrew common ejection seat (NACES). To meet the needs of a new mission, the NACES modular design can be upgraded without a total redesign to the seat. This capability supports a wider aircrew population, including female pilots, and ensures safe ejection for both the smaller and larger aircrew. Phase II of its development included a new digital sequencer that controls critical seat functions to improve seat performance and reduce seat cost. Phase III is planned for 2009 and will improve high-speed ejection-seat performance through the NACES stability improvement program (SIP). This is done with a new drogue stabilization system. NACES upgrades will replace older escape systems in various USMC FA-18s.

PMA202 is developing an alternative oxygen solution for the E-2D, Advanced Hawkeye, with installation of an onboard oxygen-generating system (OBOGS), instead of LOX bottles. The transition to OBOGS across all naval aircraft eventually will eliminate LOX infrastructure and reduce costs.

### See something you like?

If you see a commercial off-the-shelf (COTS) survival item or clothing article that you think would benefit the fleet and be an improvement over your existing survival equipment.

### Want to get it?

Visit the PMA202 website and submit a request for new gear or contact the State of the Art Survival Items (SOASI) program manager, John Birtwistle at [john.birtwistle.ctr@navy.mil](mailto:john.birtwistle.ctr@navy.mil). If the requested item qualifies, then local purchase will be authorized.

“People often can’t appreciate the work it takes to get a product properly integrated to the aircraft and out the door,” King said; for example, seat cushions that meet the requirements for extended missions.

King pointed out a Hornet mishap where an unauthorized cushion had been installed. He added, “You can’t simply install a cushion in the seat. As a sub-component of an ejection seat, these seats are complex systems that are sensitive to weight, center of gravity, or structural changes. The same analysis is being done to safely integrate the joint helmet-mounted cueing system (JHMCS) with current ejection seats.

*POC: Gary King, 301-757-6985,*

*email: [gary.king@navy.mil](mailto:gary.king@navy.mil).*

### Aircrew-mounted systems:

An ongoing in-service program improves gear that aviators and maintainers currently use. “Fleet support teams,” according to Dex Hansard, “work with the fleet users to identify deficiencies.” With this information, the teams obtain funding and get the fixes in place.

All future aviators will fight with the next generation of helmet, the joint helmet-mounted cueing system (JHMCS), which interfaces with the aircraft’s computers, weapons, and sensor hardware. It currently is flying in the Hornet. JHMCS boasts a man-mounted, ejection-compatible, helmet-display system that optically projects aircraft, weapons and target information on the helmet visor.

The flight-deck cranial and flight helmet are being redesigned. “If you include the other services,” Hansard says, “27 different configurations of flight helmets are in use, with three display modules. The intent is to develop a common helmet and cranial, with two variations: one for rotary aircraft and one for fixed wing.” Night-vision devices (NVDs) and noise-protection requirements are being integrated into the flight-deck cranial. The next generation of NVDs in development significantly will improve night visual acuity and the field of view. The JHMCS night-vision cueing and display (NVCD) will integrate image-intensifier capabilities into the existing day-capable system for night operations.

The proliferation of battlefield lasers requires protection against hostile wavelengths. Improved laser spectacles and the joint aircrew laser eye-protection visor (JALEPV) will provide day and limited night protection for tactical and rotary aircrew.

A specific PMA202 success story is the multi-climate protection (MCP) system. MCP is a multi-layered clothing ensemble made with state-of-the-art fabrics that insulate without being bulky or heavy. The pro-



gram office expedited cold-weather ensembles for Marines in Afghanistan.

*POC: Dex Hansard, 301-757-6972,  
email: derwin.hansard@navy.mil.*

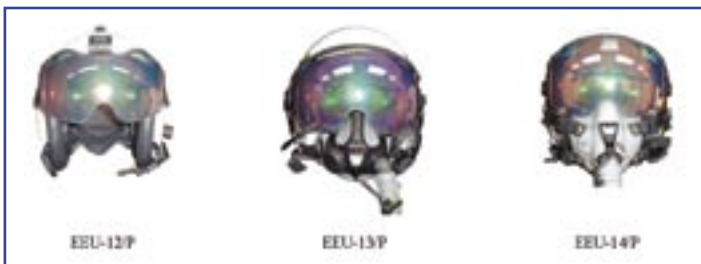
### **Survival electronics and equipment:**

The PRC-149A and the URT-140 radio beacon replace legacy radios not compatible with the SARSAT system. New radios offer enhanced search-and-rescue (SAR) location and will operate on all three internationally recognized SAR frequencies.

PMA202 is developing a helicopter egress system for passengers (HESP). This system integrates inflatable flotation with an underwater breathing air bottle to make it easier for troops to escape from a sinking aircraft. HESP is being developed in cooperation with the Marine Corps Combat Development Command (MCCDC).

Ricardo Springs, program manager, also pointed out the state-of-the-art survival item (SOASI) program, which “fast tracks” the process to qualify items for use. SOASI items are usually commercial items currently available to recreational outdoorsmen, such as flashlights, knives, signals, and some high-tech clothing.

*POC: Ricardo Springs, 301-757-6955,  
email: Ricardo.springs@navy.mil.*



### **Chemical-biological defense:**

This division works very closely with joint programs, which is important because the Navy has many unique requirements that must be factored into DoD programs. This division provides and services three types of equipment: individual protection, detection and decontamination.

Current programs include the joint protective aircrew ensemble (JPACE); joint-service aircrew mask (JSAM), which protects aircrew; joint chemical-warfare agent detection, for point detecting and identifying chemical agents; joint-service personnel/skin decontamination system (JSPDS); and joint material decontamination system (JMDS) to clean contaminated personnel and equipment. Future programs include standoff detection systems, which will detect and identify nerve,

blister, and blood-agent vapors at significant distances.

“We hope the gear won’t have to be used,” said team member David Coughlin, “but we have to be ready to use it when needed.” He pointed out that 21st century realities really bring the threat to focus.

The seriousness of CBR gear led to issuing a NATOPS for chem-bio. Team member Sam Frazier said of the manual, “It’s available on our website and covers individuals, aircraft and organizations.”

GySgt. Forrest Sibley, fleet liaison, pointed out a specific area where maintainers can help themselves. “Check the gear and size new arrivals ahead of time to build a database so equipment is ready to go.” He added that this equipment could be tracked with SEATS.

*POCs: Joe Marquis, (301) 757-6969,  
email: joseph.marquis@navy.mil;  
Sam Frazier, 301-342-3582,  
email: Samuel.frazier@navy.mil.  
David Coughlin, 301-757-6967,  
email: david.coughlin@navy.mil.*

### **Fleet support:**

NavAir’s fleet-support team works with maintainers and aircrew. Six teams provide engineering and logistics support for new and modified equipment, and help investigate mishaps.

Cdr. Joe Essex says his team is ready to “respond to problems with any system, provide training, and find a fix for any deficiency.” These people are the link between their developmental team and the fleet as NavAir products hit the fleet. Cdr. Essex adds, “We want to visit every squadron, every base, every year.” Their role is to take care of the fleet user, or as he says, “Adapting gear to the mission to meet changing mission.” The six fleet-support teams are:

- Aviation life-support systems: survival vests, anti-exposure suits, torso harnesses, life preservers, helmets, oxygen masks, flight suits, boots, radio/beacons, and parachutes.
- Aircrew-escape systems: ejection seats, crash-worthy seats, fixed aircraft seating, and ejection-seat parachutes.
- Aircrew-oxygen systems: regulators and related support equipment.
- Night-vision systems: night-vision goggles, operator and intermediate-level test sets.
- FAILSAFE: This program systematically introduces new or modified aviation life-support systems (ALSS) to fleet operators and maintainers—specifically targeting purpose, proper use, sizing, modifications, and





POC: Cdr. Joe Essex, 301-757-6976,  
email: joseph.essex@navy.mil.

maintenance issues.

- Mishap investigations: Examine life-support and survival gear involved in aircraft mishaps. This team assists the Naval Safety Center in determining the possible causes of a mishap and possible causes of pilot, air-crew and passenger injuries.

### Aircrew systems discrepancies and maintenance issues:

Documentation of fleet-support discrepancies and maintenance issues should be completed in accordance with the Naval Aviation Maintenance Discrepancy Reporting Program (NAMDRP), as detailed in OpNavInst 4790.2 series.

### Submit all NAMDRP reports to PMA202:

IAW OpNav 4790.2 series or via <https://ei.navair.navy.mil> website or via your Defense Message Dissemination System (DMDS)

Challenges abound in PMA202 to support the fleet. Capt. Jaynes said, “We need to be responsive and have a measured success. We measure success by cost, schedule and performance, and the ability to meet all aspects

stated in the business plan.”

Questions often arise about the length of delivery schedules, and what can be done to expedite a fix or implement a product for an urgent requirement. NavAir has the ability to purchase existing gear or COTS (commercial off-the-shelf) products. The acquisition process is accelerated, but, as always, the NavAir engineers examine the product and must approve it.

While it may be easy to be critical of how long it takes to provide some equipment and programs, it’s important to understand that NavAir only approves gear that meet certain standards. “When changing gear or equipment, PMA202 can’t respond without doing it the right way. We take a step-by-step process to make sure the solution is right, and we ‘lean’ the process,” said Capt. Jaynes. As each program gets approved for development, milestones are set to track progress. While this entire effort may take from months to several years, the goal is to deliver a product that works when needed.

*For more information about PMA202, visit their website at <https://home.navair.navy.mil/pma202/>.*

*Other key POCs within PMA202 are:*

*Martin Ahmad, Principle Deputy Program Manager, 301-757-9015, email: martin.ahmad@navy.mil.*

*Jill Moore, Aircraft Systems Tier II, 301-757-6932, email: jill.moore@navy.mil.*

*John Fabrizio, Assistant Program Manager for Logistics, 301-757-6978, email: john.fabrizio@navy.mil.*

*GySgt. Forrest Sibley, Fleet Maintenance Liaison, 301-757-7318, email: john.fabrizio@navy.mil*

## PMA209: Air Combat Electronics

*Mission: To provide, integrate and support cost-effective, world-class, transformational airborne capability-centric solutions to enable common warfighter safety, connectivity, computing and interoperability needs.*

### MFOQA: Military Flight Operations Quality Assurance Program

The following scenario for aircrew may sound familiar: The mission is over, and the debrief begins. The LSO breaks out a shopping list of problems observed with your approach and

landing. You listen to his sage observations as he critiques your airspeed, altitude, and even your dance with centerline. You often think, “Is he talking about the same approach I just nailed?”

In the past, you accepted the critical review. Now, you and the LSO can play back the approach, not just through a PLAT camera, rather with detailed information gathered from a flight-data recorder. Welcome to MFOQA.

NAVAIR is developing this program to provide timely feedback, not only for the aircrew debrief, but for the maintainers. The program will use new

software with existing hardware, in multiple platforms, to record data and provide feedback to aviators and maintenance on factual performance.

Another after-flight exercise is the visit to maintenance control to write gripes. Was there really a fuel-flow split? Exactly how long did you have an EGT spike? No longer will there be questions about specific events occurring during a flight. MFOQA will show the aviators and maintainers exactly what happened and when. Specific aircrew actions (throttle and stick movements) and cockpit indications will be available for review, reducing miscommunication and improving fact-based troubleshooting.

Getting specific data to the aircrew on airspeed, altitudes, and headings will improve their learning curve and will result in increased proficiency—a better pilot. For maintainers, postflight information readily will be available to diagnose data on engine performance, fuel flow, navigation, G forces, and many other parameters collected on recorders.

PMA209's Director of Flight Operations, Bill Wescoe, says MFOQA will "give the aircrew and maintainers the tools to help troubleshoot discrepancies and improve performance. The postflight debrief will include data to give a snapshot of pilot and aircraft performance." This data won't be limited to helping just the aircrew and maintenance, but to the operations, safety and training departments. To reflect the broad spectrum of beneficiaries, Wescoe used the acronym "MOST," meaning maintenance, ops, safety and training. An operations officer could use the information to look for efficiencies in fuel usage, flight time, and mission profiles. Critical data could be sent fleetwide to notify other squadrons of maintenance mods, inspection requirements, or servicing.

"Several years ago, we did a study on Class A flight mishaps. For the five year period ending in the fall of 2003, we had more than 200 Class A mishaps, and we believe at least 21 of them (10 percent) could have been

## Flight Data Analysis

This event is detected when the aircraft experiences high positive vertical accelerations that are greater than 6 g's.

Date	StartTime	EndTime	Duration	Min.	Max.	Avg.	Max. Exceed	Avg. Exceed
11/13/2002	00:26:45	00:26:47	00:00:02	6.01	6.84	6.44	0.84	0.44
11/14/2002	00:20:14	00:20:16	00:00:02	6.09	6.46	6.30	0.46	0.30
11/14/2002	00:24:31	00:24:34	00:00:03	6.34	6.71	6.50	0.71	0.50
11/14/2002	00:34:25	00:34:30	00:00:05	6.28	7.09	6.70	1.09	0.70
11/18/2002	00:16:24	00:16:26	00:00:02	6.09	6.22	6.17	0.22	0.17
11/18/2002	00:29:16	00:29:18	00:00:02	6.22	6.34	6.30	0.34	0.30
11/19/2002	00:27:03	00:27:04	00:00:01	6.22	6.59	6.40	0.59	0.40
11/21/2002	00:54:47	00:54:52	00:00:05	5.97	6.59	6.26	0.59	0.26
11/21/2002	00:55:34	00:55:40	00:00:06	6.09	6.46	6.27	0.46	0.27

MFOQA data records will provide feedback to aviators and maintainers.

prevented had a tool such as MFOQA been in place," said Chip Brown, the program's lead engineer and former flight-data analyst at the Naval Safety Center, who initiated the study. The intent of MFOQA is to identify human factors and trends to head off potential mishaps. Perceived performance can be contrasted to actual performance through MFOQA.

Two squadrons, one FA-18C/D and one SH-60B, currently are doing a fleet demo or "bridge" program with MFOQA. The initial results have been very positive. The *Mech* Spring 2006 issue has a feature article on HSL-41's MFOQA's efforts and can be viewed at: <http://www.safetycenter.navy.mil/media/mech/issues/spring06/pdf/hsl-41leads.pdf>.

The *Mech* Fall 2003 issue also included an article that provides an overview and background for the program. View this article at: <http://www.safetycenter.navy.mil/media/mech/issues/fall03/pdf/mfoqa.PDF>.

MFOQA became a program of record last year with passage of milestone B. The program has full funding and will be introduced to the fleet in a staggered implementation scheduled in early 2010.

### MFOQA POCs are:

*Bill Wescoe, 301-757-6773, email:*

*William.Wescoe@navy.mil.*

*Tom Matthews, Integrated Project Team Lead, 301-757-6706, email: Thomas.matthews@navy.mil.*

*Chip Brown, 301-757-7693, email: chip-brown@navy.mil.*

*Visit the PMA209 website at: <http://pma209.navair.navy.mil/home.asp>*